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ABSTRACT

This document describes the development of computer conferencing (CC) and its role within information service communities, particularly in Finland and Sweden. CC is defined as a computer-based messaging (CBM) system providing an asynchronous communications structure for group work. It is noted that CC differs from electronic mail and that CC software additionally supports text processing, collaborative electronic publishing, information retrieval, and personal documentation. Following introductory material, sections describe: (1) the use of CC as a tool for knowledge workers, with subsections providing definitions of basic telematic concepts, information on CC systems configurations, such as the Electronic Information Exchange System (EIES) and the Computer Conferencing System (COM) developed in the United States and Sweden respectively, a description of knowledge workshops, and information on CC systems in use; (2) possible ways of combining CC with information services; and (3) CC experiments at the Technical Research Centre of Finland testing the practicality of offering online bibliographic retrieval services to CC communities in Finland and Sweden, which contain mainly data processing (adp) experts. It is concluded that information services should be offered via CC systems, but that the importance of personal contacts in accessing information must be realized. A list of 27 references and related appendices are also provided. (ESR)

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IR050549

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COMPUTER CONFERENCE IN INFORMATION SERVICE

Aatto J. Repo
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Francis Bacon /1/:

"Reading maketh a full man; conference a ready man; and writing an exact man". Computer conference is a system for supporting all these three at the same time.

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ABSTRACT

The Technical Information Service of the Technical Research Centre of Finland has studied the role of computer conference (CC) within information service communities. The integration of adp-, storage and telecommunication technology by the help of CC systems is making it possible for the knowledge workers to do their jobs much more effectively. Computer Conference is an asynchronous meeting with typed messages and additionally the CC software usually supports text processing, collaborative electronic publishing, information retrieving and personal documentation, though there are signs that it will be more reasonable to use some of these facilities locally, when communicating micro computers come into wider use.

The connections of the CC systems to other telematic technology, CC systems configurations and several examples of their use in practice will be introduced. The CC software, COM and EIES are examined more closely. On the idea level it is possible (1) to use CC within the information service professionals and (2) to offer information services to the clients via CC software. These ideas are examined and the former studies are explained in the report.

The practical experiments for offering information services via the CC system were performed by COM software in Finland and Sweden. As CC communities mainly include adp experts, the use of online references was quite low. The break-through of the CC systems still waits for the spreading of personal work stations and after that rises the need for studying human communication via CC systems more thoroughly. For the information specialists this emergence of CC systems means e.g. the need to offer information services via CC systems, and to realize the increasing importance of "grey information" and personal contacts in accessing information.

FOREWORD

Information or telematic technologies introduce a whole set of new possibilities to us; particularly to knowledge workers who create, process, transmit and use information in their jobs. In this study we have taken the computer conference for examination, and considered how it can be used in the information service community.

The study has been an adventure. With a terminal or personal computer, modem and telephone we have reached people all around the world. In this respect the situation is quite similar to those pioneers of the online age some ten years ago. And like pioneers and adventurers always, here too, we have bumped into several problems like unsatisfactory telecommunication networks and inadequate systems manuals, but still the future with computer conference as a facility in the coming information society has begun to seem so promising during the trip that the efforts certainly are worth the trouble.

The journey was sponsored by the Nordic Council for Scientific Information and Research Libraries (NORDINFO) and the Technical Research Centre of Finland (VTT). The study has been carried out in the Technical Information Service of VTT.

Besides the sponsors I want to thank the computer conference communities particularly in Sweden, the U.S. and Finland. Via the computer conference information specialists have made acquaintance with adp experts and other early pioneers of computer conferencing. And this is just the beginning.

Espoo, March 1983 Aatto J. Repo

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1 INTRODUCTION

When we speak about new technological possibilities, e.g. computerized conferencing in the field of information services, it is useful, because of many differing definitions, to describe as a background what we mean by information science specifically in this connection. We find one of the most attractive definitions in the works of the Austrian philosopher Karl Popper when he speaks about the knowledge world, which is a combination of all human information accumulated during the history of mankind. This 'objective information' collected mainly in libraries and archives has not been used as a whole because of the difficulties in getting 'right information in right time to right place'. /2/

Telematic technology can aid us and we may define information science combined with computer science as follows:

> "Information science to date has been the weak sister of computer science. In computer science the questions of the effectiveness and efficiencies of hardware and software are at least well-structured problems. In information science the associated question, whether computer systems accomplish anything for a human in a cognitive sense, is less well structured. To a large extent the field of information science is not represented by an agreed-upon paradigm by those that practice it. We suspect that the blending of human communications into information systems will provide the basis for the emergence of a paradigm. We are now presented with the capability of "digitalizing the cognitive process" so it can become part of the research process and be dealt with as an integral part of the system. The realization of the dreams of the information scientists now seems possible." /3, p. 277/

The short history of information specialist is highly technology oriented. We have had libraries for thousands of years, but the information business and special information service units are only

some decades old. [1] Information specialists are finding their speciality somewhere near the so called "in-between" systems, which means they are working in organizations trying to help those who need information both from sources inside and outside the organization. Of course there are information specialists working both in individual units, e.g. information services, information analyzing centres, etc., and in organizations acting as a source of information like libraries or archives. All the same their main duty is to fulfill the individual needs of their clients.

The classical way to describe the relationship among information transfer participants and functions is expressed in terms of a spiral (Figure 1). Although this production oriented picture is unable to clarify the need and use of information, it shapes the whole generation of knowledge.

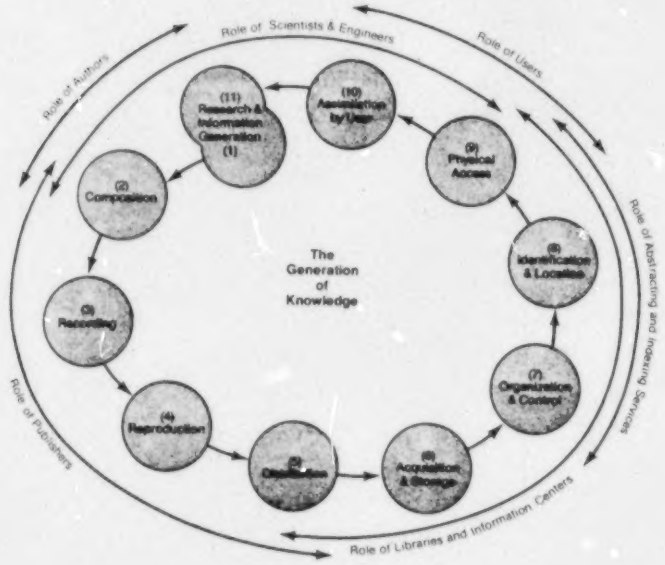

Figure 1. The Information Transfer Spiral. Source: King Research, Inc., 1977. /4/

[1] Besides the youth of the occupation, the rising of new technology is rapidly changing the information specialist's job; e.g. at the 6th International Online Conference last December it was said that the role of the information specialist as a gatekeeper will be changing up to the end in 1985, while a new role as a consultant will be strengthening.

Several pieces of equipment of telematic technology are used on many levels of the information transfer spiral. Bruce Christie has listed some of them, including the computer conference, in Table 1.

Table 1 Approximate relative performance of the systems at different stages of the information cycle (intuitive generalizations) /5/.

Type of system	Production	Commitment to store	Retrieval	Use	Communication	Overall
• large, shared-logic word processing systems	***	***	***	**	***	***
• communicating word processors	***	**	**	**	**	**
• stand-alone word processors	***	**	**	**	*	**
• videotex	**	*	**	*	*	**
• teletext	**	*	*	*	—	*
• computer conferencing	*	**	*	**	***	**
• unintelligent communications systems, e.g. facsimile	—	—	—	—	**	*
• specialized computer access systems (generally speaking)	*	*	variable	variable	variable	variable

Key: *** = high
** = medium
* = low
— = not useful

We could naturally start arguing about "the stars" in the picture, because diverse individual systems under the same concept have differing features, but still it gives a good overall view of the relationship of information flow and information technology. Additionally one could say the figure is much more user oriented than the transfer spiral. Computer conference systems have particularly specialized in the communication and use of information.

And communication is the soul of the coming information society. As soon as we drop the place restriction and conceive of utopia as a state of existence, not a physical location, the problem of creating and sustaining an ideal community becomes simpler. Through using an existing communications network it is already possible to link widely

scattered individuals with one another and with a common mechanism for storing and processing information to create a computer conference. To date, most computer conferences have been set up to address short-term problems of limited scope within professional discussions. But the same techniques and electronic networks could be used for the express purpose of pooling knowledge and skills to achieve utopian objectives. /6/

But what is so attractive in a thing that actually has existed as an unused possibility of the time of online remote use of computers? - Perhaps, because it realizes the old expression "everything is a part of everything" by making possible - at least in theory - the combination of other telematic applications with a beautiful discussion, or because it is a poor man's rich means for communication. Or do we have to refer to even more spiritual matters: "... the forms and rituals of communications via computer are at least as interesting to study as the rain dance, and potentially much more important for the future of a society which may be forced to choose cheap telecommunication alternatives in the era of scarce resources. Stretching the analogy between studying the rain dance and studying computer-mediated communications to its fullest, the rain dance may be seen as a cultural reaction to a crisis situation with which the society does not know how to deal; so may the large-scale experimentation with new computer and communication technologies." /7/

2 COMPUTER CONFERENCE AS A TOOL FOR THE KNOWLEDGE WORKER

Professional work, where the acquisition, processing, storing, representing and communication of information knowledge plays a major role, may be defined as knowledge work. Many professional problems or tasks of scientists, designers, information officers, journalists, executives and lawyers etc. are, in a broad sense, examples of knowledge work. These people may be called knowledge workers. Doing their work - e.g. performing a task or solving a problem - they are engaged in a more or less structured process which depends on the task/problem at hand and their professional education and experience - and to a

large extent on their ability to communicate with those who could help them /8/.

The computer conference is a new tool for the knowledge worker. In the first place the categories of work that are suitable for this substitution include the activities of some types of managers, information analysts, computer professionals and information specialists. These "natural" pioneers already have technical know-how on using computer terminals and have enough knowledge for keying; both these remove those barriers which have to be overcome when starting to use a computer conference system.

2.1 Basic Concepts

UNESCO has defined new information technology as "the scientific, technological and engineering disciplines and the management techniques used in information handling and processing; their applications; computers and their interactions with men and machines; and associated social, economic and cultural matters". This must be completed by communication technology meaning the set of disciplines used in accomplishing one- or two-way communication without face-to-face meeting. And all this can be called telematics.

Telematics is on everyone's lips in the field of information services. All this talk about satellites, holography, video discs, videotex, teletex, teletext etc. makes us quite confused. One attempt to clarify the concepts is to divide the new technologies into basic technology and its applications. Actually one may even speak about a third level: the use of those applications, e.g. in our field.

Basic technology - thet more or less needed in every application - involves computers, telecommunication networks, memory facilities and input-output devices. In many applications computer means only a control processing unit (CPU) on a chip. Networks are at present mostly made of wire pairs and coaxial cables and in the future additionally of satellite, fiber optic or even laser links; however, for the users of those networks these new techniques only make it economically possible to transfer more information far more quickly.

As a memory device paper was much better than a stone block, while a computerized system needs a set of memory devices for different purposes; core storage, disk storage, mass storages like drum storage, or in the future digital optical discs, special storages like magnetic bubble storages, etc. The man-machine interface needs also its own equipment: terminals, display terminals, printers, special terminals, for example, for graphics. Input is still mostly keyboarding, but the use of optical readers and coming audio input is gaining ground, although the nature of natural language still restricts the use of the last mentioned device.

Various kinds of lists of applications of the new technology can be given depending on the field under discussion. Facilities needed might be

- text processing
- teletex
- computer based messaging (CBM)
- teleconference
- facsimile
- online database
- videotex
- teletext
- cable TV.

These applications have developed separately: the need to develop typing arose, so they developed text processing equipment; teletex is a better telex; CBM and facsimile are complementing postal services; online databases, videotex, teletext and cable TV are, among other things, expanding the capabilities of electronic publishing.

Teleconference makes the participants of a conference independent of being in the same place at the same time like in face-to-face conferences. There are three different kinds of teleconferences

1) audio teleconference,
2) videoteleconference and
3) computer (tele)conference (CC).

It is assumed /9/ that all three media will become more widely accessible and more familiar to the public. Morever the distinctions

between audio, video, and computer conference will continue to be meaningful. While future media are likely to combine characteristics from each of these media, these distinctions help to focus on the issues involved in selecting and using electronic media for group communication.

Audio teleconference is an extension of the telephone conversation, where several people from separate places participate in the discussion. When one uses freeze-frame video, telecopying and telewriting, the conference may be called an audio-graphic teleconference. When moving pictures of the participants are added it is called a video teleconference. The latter was mentioned as a substitute for business travel in many forecasts about ten years ago -nowadays videoconferences and teleconferences are generally spoken of as a complement to face-to-face meetings. /10/

Computer conference (CC) is an asyncronous meeting with typed messaging. Thus, CC differs from the other type of teleconferences in that you are also independent of time in addition to independent of place. Another definition /11/ says that a computer conference system can be seen as something half-way between a conference and very rapidly published newsletter.

A member of a CC writes - some of us are in our impatience waiting for the possibility to speak - messages in ordinary human language using her/his terminal and locates a message in the memory of the computer system by sending it to one or more conferences, which means she/he gives the definitions in which conferences the message can be read. To read messages sent to the particular conference she/he only accesses to the conference and gives the commands (the commands vary depending on the system used) needed, for example to read new messages, the last message or review some old ones. Of course, in every CC system containing tens or even hundreds of conferences dealing with different subjects, it is also possible to send letters to the participants like in electronic mailing systems.

Special features of the concept of computer conference:

* ELECTRONIC INFORMATION EXCHANGE
* ASYNCHRONOUS
* TOTALLY DOCUMENTED COMMUNICATION
* SELF-ACTIVATED, INDEPENDENT PARTICIPANTS
* STRUCTURED DISCUSSION WHEN NEEDED: VOTING, ANONYMITY,...
* AUTOMATIC BOOKKEEPING

Because of many confusing opinions it is worth underlining that computer conference is not the same as electronic mail. Partly it can be seen as a computer-based messaging (CBM) system, having the same features as electronic bulletin boards, though the main idea is different. The computer conference gives tailored communications structures for group work, which partly did not exist before, e.g. an effective working tool for big groups (some tens of participants). Electronic mail is mainly automating the work of postmen, although some recent mailing systems have such features they are becoming more like computer conference systems.

Because of its historical roots and its explicit capabilities, computer conferencing has been quite different from electronic messaging. Technically, the computer conference involves shared files; an entry is not a separate file transmitted to another user, but an addition to a multi-access database. (Some users may not be allowed access to some parts of the file, however.) Thus the emphasis is upon the sharing, and not on the transmission, of communications. This file and its contents can then be processed in various ways by the conferencing software according to the tasks and rules of the relevant conference. As one of several teleconferencing media, the computer conference emphasizes communications between and among specified groups separated by time and space, engaged in collective dialogues, perhaps with a given agenda. /12/

Audio- and videoconferences need special rooms and equipment, and the latter a wide range of telecommunication facilities, but for

participation in a CC you need only a terminal, a modem and a telephone (e.g. like in using online databases), and at the other end a computer and CC software. Additionally you need to know where those conferences you are interested in take place! - You surely can save time and money by using a micro computer capable of communication and special telecommunication networks.

As we all have noticed, providers of most of the telecommunication networks have an electronic mailing system for their clients. It seems that the next step in the process is to provide CC software, and then the conference arrangers in different fields will recognize the new possibility to provide an excellent complement in the area of conferencing. Indications of this kind of development can already be seen. Just to give an example, both IBM with their E-MAIL and HP with their HP-MAIL have announced they will soon be offering conferencing extensions to their mailing systems.

2.2 System configurations

The history of CC begins somewhere around 1970 quite accidentally when Murray Turoff, working in the Office of the Emergency Preparedness of the President of the United States, got the idea of using a computer in Delphi research. The first system was called EMISARI (Emergency Management Information System and Reference Index). Later the Institute for the Future in the U.S. developed the FORUM system on the basis of EMISARI, the simple version of FORUM called PLANET now being offered to users by a commercial enterprise, Infomedia Inc.

Various CC software has since been developed for many computers. For a brief overall introduction to CC see Ronald E. Rice's presentation /12/, which also sums up the empirical studies of CC in the 70's. Examples of systems in use are to be found in COM message by Jacob Palme (Figure 2). The list is not complete, for example the International Institute for Applied Systems Analysis (IIASA) has developed a system called Telecenter for their own use /13/.

```
(Text 3228) 82-11-02  19.02  Jacob Palme QZ
Receiver:  <19>
Comment to: (Text 3171) by Paul Bryant <1>
Subject:  COM and its mates
-------------------------------------------------------------
Wellknown computer conferencing systems are:
EIES - run by New Jersey Institute of Technology
PLANET-FORUM - developed by the Institute for the Future in California
NOTEPAD - developed by Infomedia Corp in California by the same
people who developed PLANET-FORUM
HUB - has also graphic communication
CONFER - note that there are two different computer conferencing
(Please press return key)
systems both with the name CONFER. One of them was developed
at the University of Michigan and Wayne State University and
runs on Amdahl computers.
PANALOG - Designed by Edward M. Housman of GTE Labs.
COM - Our system.
PORTACOM - a portable version of COM to be implemented on many
different computers.

Sources for the above list: "Studies of computer mediated communication
systems: A synthesis of the findings" by Starr Roxanne Hiltz
and Elaine B. Kerr. published by the New Jersey Institute
of Technology.
(Text 3228)----------                    (1 comment)
```

Figure 2. Some well-known computer conference systems. (The text is in the English versions of COM in Stockholm QZ. DEC 10).

The most examined CC system is surely the EIES (Electronic Information Exchange System) of the Computerized Conferencing and Communications Center of the New Jersey Institute of Technology; Murray Turoff is the head of the CC center. The structure of the EIES can be described in four parts: messages, notebooks, conferences and directories; for introduction see /3, 14/ and figure 3.

```
-2001:01-012-
please log in: [redacted]
password: ;3110201000250

remote: call connected

Welcome
Name or ?aatu
Cod[redacted]
NJIT Electronic Information Exchange System (03176?)

Aatto J. Repo (Aatu,599) on at  3/25/83  3:49 AM EST via Telenet Foreign User
Paid

Last Active:  3/16/83  9:28 AM
LIST THOSE NOW ON-LINE(Y/N)?n

No Messages Waiting.

INITIAL CHOICE?

Access to:
  Messages         (1)
  Conferences      (2)
  Notebooks        (3)
  Special Systems  (4)
  Directory        (5)
  Explanations     (6)
  Reviews          (7)
  Composition      (8)
  Monitoring       (9)
INITIAL CHOICE?--
```

Figure 3. Access to EIES from Finland

Messaging is a basic function of the CC system. Manipulating pointers in computer memory files, you may operate with your message by sending it, copying it, editing it, etc. The notebook is the personal writing space of the CC system for all the members, where you may have calendars, copies of messages, journal drafts and whatever - nowadays if you have a communicating micro computer with word processing capability it is cheaper to have your own notebooks locally. However, shared notebooks are certainly needed for joint authorship.

There are several types of conference in the EIES. The public conference is open to all the members of the system. A group conference is a more formal arrangement to which members of a pre-defined group belong. Private conferences are for restricted private discussion, and

a value-added conference is defined by the sponsoring member, who can add special programs and material to it, and others who are willing to pay a fee. Each conference has a leader to administer the conference. Conferencing includes voting, text searches and automatic delivery of new material. Directories are needed in the examination of conferences, members etc. Additionally the EIES offers some special systems, e.g. electronic newsletter called CHIMO, INTEREST for combining people and particular interest fields and SURVEY for composing online-questionnaires.

The use of the EIES has been broadly examined in several respects. One project studied the impact of a CC system on scientific research communities /7/. They examined how groups of scientists dealing with future research methodology, social networks community and general systems theory, used the EIES over 18 months. One of the results was that it takes much effort to introduce new media; you have to use the system at least one hour/week to be satisfied; and the group needs an active leader.

The general configuration of CC systems is quite similar although there are no standards and so commands and the possibilities of detail level vary a lot. In Finland we are mostly familiar with the COM (Computerized Conferencing system), which has been developed by the Swedish National Defence Research Institute (FOA) for the DEC-10/20 computers. COM was developed in the late 70's. Previously there had been some trials with using the American computerized conferencing system FORUM in Sweden. COM is a CC system including fewer features than the EIES, but at a time of communicative intellectual terminals and micros this remarkably user-friendly system provides a fully satisfactory CC tool for messaging, conferencing, joint publishing (actually CC may act as a tool for sending and receiving manuscripts), electronic publishing, etc. There is both a Swedish and an English version of COM. More detailed information is given in the report of the use of COM /11/ and in the user's manuals /15, 16/.

The short history of CC systems has produced diverse systems around the world. However, from the beginning of the 80's there has been some international cooperation. The first approach began in

1979, when the European cooperative research project COST-11 decided to develop a new portable CC system based on COM, more recently called PORTACOM; for the summary of COM and PORTACOM facilities see Appendix 1. Another important effort within COST-11 is the GILT project, where the aim is to develop standards for interconnecting computer based message systems (both pure mailing systems and conferencing systems). The third interesting pilot study is the MAILNET project. MAILNET aims to connect mail and computer conference systems at a large number of American universities. Stockholm University Computing Centre (QZ) is the only non-American participant in the project.

A selective glance at the history of CC systems:

1971	Emisari
1972	Forum-Planet
1975	EIES
1978	The COM system (DEC-10/20)
1983	PORTACOM (Norsk Data, IBM, CDC Cyber, DEC VAX-11, Univac/11, Burroughs 7800, Siemens B 2000)

GILT-PROJECT (STANDARD BETWEEN DIFFERENT CC SYSTEMS)

2.3 Knowledge workshops

The working environment of knowledge workers is rapidly changing, thanks to telematic technology; new means for processing and communicating information surround us. In order to make some sense of this, efforts have been made to analyze the situation from the information workers' (or knowledge workers') point of view.

The idea is to make knowledge workers' daily routine work as easy as possible /8, 17/. It is necessary to find a combination of systems, accessible via one terminal only. Of course, there are special purpose systems, e.g. special terminals or fast printers, which may be common to several knowledge workers. The word for this kind of knowledge work arrangement is a knowledge work station or a knowledge workshop. - It is better to use here the term knowledge workshop because the term

knowledge work station already has a particular meaning in office automation: it refers to the input-output facilities of an office worker in general.

Knowledge workshops have existed for centuries, but the maximation of their effectiveness by systematically evolving tools, methods, etc. is heavily dependent upon the new information technology. In the sense Engelbart /17/ means, the knowledge workshop should have subsystems like:

1. A local text processing facility for typing and editing messages, one's own files, etc. This is necessary because of relatively high telecommunication charges.
2. Telecommunication facilities for computer conferencing for participation in professional asynchronous meetings.
3. A system for collaborative electronic publishing, which consists of text processing and computer conferencing systems together.
4. Access to remote online information, e.g. online databases and videotex systems.
5. Local files for notebooks, calendars, and personal documentation.
6. Conferencing software is available for restricted publishing within a group of people: for example in one organization you may have 'a community handbook' online.
7. In spite of these common facilities, a particular knowledge worker needs special support facilities. Using telecommunication networks he should have the possibility of using several computers for a certain purpose, for example, statistical programs and conceptual or analytical models. Here we come close to the computerized expert systems, which support knowledge work in a much broader sense than in seeking information and in communication only.

There has been recently much talk about technical integration of new telematic facilities so that knowledge workshops would be reality in the near future. The most obvious course of development is that dedicated systems for different kinds of knowledge workers produce a wide variety of knowledge workshops which have the above mentioned

basic facilities and which are linked together via local networks and have links to general telecommunications networks as well.

The computer conference will have a major role in the communication habits of knowledge workers among conventional and other new facilities. Johansen et. al. have studied the effects of CC on when, where, how and with whom people work, Table 2. In interpreting the documented and possible effects we must proceed with caution, because this was a conclusion of one particular study, although some other studies (e.g. in ref. 11) have had parallel results.

Table 2. Effects of computer conferencing on patterns of working suggested by the Johansen et. al. study (From Johansen, DeGrasse & Wil[illegible]on, 1978) /12/.

	Range of options	Documented effects	Possible effects
With whom people work	Nearby colleagues Distantly located colleagues Persons from varied disciplines Persons of varied quality	More communication with distantly located researchers Expedites communication among those interested in communicating (requires high communication need)	More international communication More geographically separated working groups Information overload
When people work	Office hours Evenings Weekends Simultaneously with others Irregular times	Often used outside office hours (25–40% of the time) Participants continue to work outside office hours, apparently assisted by access to computer conferencing Participants can 'meet' without being present simultaneously	More flexibility in working hours Longer working hours
Where people work	Office Home While traveling Neighborhood office centre Remote retreat	Work at home is common when terminals are available Researchers can stay in touch while travelling, moving, or homebound	More variations in where researchers live and work Less office-based research
How people work	Face-to-face Mail Telephone Video teleconferencing Audio teleconferencing Computer-based teleconferencing	Computer conferencing is perceived as more productive in some instances than mail or telephone Can be used for joint authorship, information exchange, scheduling, planning, and follow-ups for face-to-face, as a bridge to other computer resources	Substitute for some mail usage Substitute for some telephone usage, but could also add new uses for telephone Could even *increase* travel

2.4 Computer conference systems in use

Computer conference systems support communication in many applications of the telematic technologies /3/. Office automation and working at home increase the need for communication. When today's

recording and accessing systems of knowledge are shifted more and more towards integrated electronical services; when Computer-Aided Instruction (CAI) becomes prevalent both in schools and in adult education; when telecommunication networks make long-distance communication economically feasible; and when cheap home terminals and personal computers come into general use, we will have several occasions daily where a CC system could help us. Also in our spare time we could use CC as a cheap means for exchanging and searching for information.

CC is certainly not the only way to find fortune. It has been shown that the CC does not substitute for other means of communication, see Table 3- 4. So you still need a telephone, mailing services, international and national face-to-face meetings etc. But there are several bottle-necks, for example, in scientific communication where one can derive comfort from the CC /3/:

- research units are separated
- scientists do not travel a lot because it is expensive
- you do not have cross-scientific communities although the need for cross-scientific work is growing
- information deluge
- remote joint publishing is difficult using conventional mailing systems
- delays in scientific publishing and slow access to scientific papers
- international joint work is difficult because of differences in time, different languages etc.

Table 3. Some results of the inquiry of CC users at the Swedish National Defence Research Institute (FOA): CC is mainly new communication (Figures received from Jacob Palme, QZ)

Does COM replace other media?	
Replaces:	Percentage of the time in COM:
Mail, messages, circulars	6 %
Telephone calls	14 %
Face-to-face meetings	13 %
New communication	65 %
Other	2 %
Total	100 %

Table 4. Some results of CC used at FOA: CC snatches little time from several activities. (Figures got from Jacob Palme, QZ)

What were you previously doing during the time now spent on COM?	
23 % telephone	5 % other work
12 % letters	5 % conferences
11 % "work"	5 % nothing
9 % leisure, friends	4 % face-to-face
8 % reading	2 % breaks
8 % dead time	1 % planning
5 % TV & radio	2 % other
	100 %

By using CC you solve some problems, e.g. joint publishing and time zone problems and perhaps get one new means for another, e.g. isolation. The use of CC in scientific work gives new possibilities in discussions related to the generation of research ideas or proposals; discussions of broad methodological, theoretical or ethical issues in the field; "professional gossip" on such things as available fundings or positions; and personal communication among scientists /3/. In spite of scientists, CC is an effective tool for information professionals acquiring, processing, representing and communicating information.

The users of CC are, of course, mostly the organizations that use computers in other tasks, too. The Computer Research Institute in California has gained encouraging experience in using a CC system, where every participant has NOTICES, with calendar facilities listing daily events, problem reports, policy notices and similar information; SUGGEST, used to send system programmers' action requests such as enhancements and bug fixes; and a number of conferences used by persons interested in discussing particular topics. /18/

The International Institute for Applied System Analysis (IIASA) uses CC in telex-type simple message sending, joint manuscript writing, administrative management of joint projects and teleconferencing in conferencing (use of the last mentioned is quite low) /19/.

In Finland, the multinational elevator company Kone, Inc. has installed a CC system for internal communication. Additionally there are in many countries, as in Sweden and in Finland, computer conferences arranged by universities or other corresponding governmental organizations for promoting the use of new communication facilities within the country. Statistics on the use of some CC systems give hints of how active conferencing is at the moment (in the beginning of the year 1983); Table 5.

Table 5. Some statistics on the use of several CC systems.
* The number of those participants and conferences which have been active during last month.

System	Number of participants*	Number of conferences*	Total time used	Read notices
COM				
- Swedish at Stockholm	813	311	565 - 15.05	1,266,253 (from July 82)
- English at Stockholm	240	47	68 - 03.46	63,442 (from July 82)
- Finnish at Helsinki	65	46	34 - 14.31	28,712 (from February 82)
EIES - New Jersey	900	400	8433 - 06.03	1,857.765

In spite of organizations using CC there have been trials with using it e.g. within electronic publishing /20, 21/; education /22/; and standardization /23/. Trials have proved that technological possibilities alone are just not enough - more attention must be paid to integrating into the system, social and behavioral protocols which facilitate group interaction since not all participants will be skilled at group relations. Additionally the former habits and protocols in e.g. article publishing are so strong that every major change must be carefully conducted. Finnish scientists have joined several international projects via CC systems. One example is the standardization work within the ISO where an international group is preparing the standard for common command language for IR systems.

Computer conference systems have still proved to offer several advantages when used regularly:

* You can take part in many on-going conferences using much less time than for face-to-face meetings.
* You can read and write at times suitable to yourself, when you have free time, or something to say or to ask for.
* You can skip messages of less interest and use the computer to help you select or search for what you want to read.
* You can get a large group of people to look at a proposal or a question and get their comments within a day or two.
* Because you save the time and cost of travel, much more intense and close cooperation is possible across geographical distances.
* People with different mother tongues often find it easier to understand each other by written than by spoken language.
* Computerized conferencing seems to work well in groups of fifty or a hundred participants, while it is well known that face-to-face meetings can be cumbersome with more than about seven participants. /11/

3 COMBINING COMPUTER CONFERENCE WITH INFORMATION SERVICE

3.1 Some ideas

When we approach the question of combining CC with information services we can find at least two different ways to do it:

1) Information specialists and librarians use CC inside their own professional groups.
2) CC is a new channel for offering information services.

The former possibility looks quite promising because quite a few information specialists are already regular users of terminals. The most obvious usages of CC are surely the discussions within several user groups of telecommunication networks, online databases and files, etc. These discussions may be held on various levels, e.g. we Finns could participate in the international, European, Scandinavian and Finnish user groups. And of course information specialists can use CC to communicate inside their own organization.

But there could surely be discussions, bulletins, joint publishing, etc. also in other subjects. We have had preliminary discussions about using CC within the Finnish Society for Information Services. I think these ideas could suit any other society as well

- in preparing and informing of meetings: calendars, agendas, minutes, tc.
- in planning conferences, seminars etc.
- in preparing, editing, transferring manuscripts and partial publishing for the journal (Signum) of the Society - in publishing, some kind of hybrid paper-electronic system will still be needed
- in augmenting working groups, e.g. in joint writing of memories
- in professional gossiping, electronic bulletin for information specialists
- in discussions about subjects of current interest
- in messaging from one user to another (or others), of course.

The information service community using CC:

(A) INFORMATION SPECIALISTS AND LIBRARIANS USE CC INSIDE OUR OWN COMMUNITY

- INTERNATIONAL AND NATIONAL CO-OPERATION (ROUTINE MEETINGS,...) e.g. NORDINFO IN SCANDINAVIA, THE FINNISH SOCIETY FOR INFORMATION SERVICES IN FINLAND
- USER GROUPS FOR ONLINE SERVICES e.g. EURONET

(B) INFORMATION SERVICE VIA COMPUTER CONFERENCE

- TRANSFERRING ONLINE DATA TO PROFESSIONAL DISCUSSIONS
- QUESTION DESK FOR USERS OF THE INFORMATION SERVICE

The other way of combining information services with the CC is directed to the users of information, where every effort for better service is surely more than welcome. One could think of establishing an electronic help desk as a CC in the CC system.

The information specialist can naturally offer (and sell) whatever services she/he or their information service has, but perhaps one of the most exciting services here are pieces of online full-text, numeric or reference data transmitted to the customer via a CC system. The electronic transmission of online data gives some new benefits: the user does not need to know anything about curious online systems, but still gets information almost as quickly as when using the online systems himself. The intermediaries can get the user's comments right away and they can broaden, correct, deepen or just be satisfied with their search.

All the above-mentioned could be done by electronic mail as well, but a CC system gives additional possibilities for satisfying the users. The intermediary can offer and transfer references, newspaper articles, time series, etc. to the professional discussion of some particular matter, when he actively notices there is a need or when one of the participants asks for help. Another occasion is a CC dealing, e.g. with some project may be opened by literature or facta search, and the experts have a discussion about the results and perhaps alter the study in the same way as mentioned earlier in connection with one customer. Additionally this new means makes it easier for professionals to reach information services beside doing other things with a CC system.

3.2 Former works and plans

There have been several individual computer conferences dealing with information scientists and librarians, e.g. the White House Conference on Library and Information Services was planned by using the EIES with 37 members of the National Advisory Committee participating in the process, and some librarians have had free discussions on matters that interested them:in the EIES there is, e.g. an open conference called LIBRARY FUTURES and in COM in Stockholm there are open conferences about information retrieval systems.

In Finland the Helsinki University of Technology acquired the computer conference system (COM) for their DEC computer in 1981. Earlier there had been some examination of possible software packages. The Swedish COM was selected mainly because it suited the available computer facilities. From the beginning the P. & T. of Finland and the Technical Research Centre of Finland have participated in acquiring experience about CC.

In October 1981 the Finnish Chambers of Commerce (FiCC) began a half-year pilot study in using COM. The Central Chamber of Commerce in Finland and nine chambers of commerce around Finland participated in the experiment. The basic use was in sending official letters to the offices from the centre in the same way as in using teletex or electronic mail: these include e.g. bulletins and different kinds of enquiries.

From the early beginning of the pilot study the idea was also to support economic information from Finnish online-databases electronically to the local offices of Chambers of Commerce. A client of a local Chamber of Commerce could get references/factual information directly to the terminal in the local office. There were data bases dealing with legal precedents, trade information, export information for Finnish firms, and statistical time series about economic matters in Finland and in the local areas. COM was used here as a help desk for the data base users; also some training in the use of one statistical time series file was conducted via COM.

As in many technical trials here also 'the chicken and egg problem' was solved by introducing first the equipment and the facilities and then starting the efforts in marketing those facilities to the real customers. So, since the use of such information offered was low before the trial, it remained low although it was now easier to obtain the information. In the first six-month period there was not enough use, so they decided to go on with the trial until the end of the year 1982. Some Chambers of Commerce left and some new ones joined the experiment.

In sending letters to Chambers of Commerce the CC system has satisfied the user otherwise, though the hybrid system causes some extra work

because all the Chambers of Commerce are not participating. During the new trial period some extra user training at the local offices is conducted and more information about the information services is provided. Additionally it is worth pointing out that there is only one information specialist supporting the project from the Central Chamber of Commerce, and the intermediaries at the local offices are mainly secretaries. The use of online databases concentrated mainly on statistical and legal informatio, while the support for training via COM was little used. One of the conclusions was that the use COM must be introduced step by step; first the different kinds of messaging applications and then new communication like conferencing.

In Sweden there has been some experiments in using information retrieval software package 3RIP for searching for information from a database built up of CC messages from a conference. The main result was that free text COM messages were not very useful for this kind of use because of the 'loose' information the CC messages also include. Better results could be gained by cleaning up messages before putting them under the IR package for searching. Search for interesting items in the CC system usually takes place via directories of conferences and participants. Besides, in the EIES one can add key words for every message one composes and the whole database of messages is available for searching via inverted file of these keywords.

There have been several plans in combining CC with information service, e.g. among Swedish information specialists at NORDFORSK and at the New Jersey Institute of Technology. Within NORDFORSK there have been discussions about establishing a conferencing arena for information specialists via COM. Still for the present not so much has been done from the point of view of information specialists; and it is worth mentioning that the above-mentioned experiences are all sponsored and conducted by CC systems providers or other adp experts, not information specialists.

On the other hand electronic mail is already used within information specialist communities. Some online database hosts have mail boxes for their clients, though in many systems only the communication between one client and the host is possible. Still there are exceptions, e.g. at the NIH/EPA Chemical Information System (CIS) there are mail boxes

for the CIS users and the clients are encouraged to communicate with each other. Besides ordinary mailing the system supports group communication in some extent, e.g. it is possible to build up group mail boxes. In Scandinavia electronic mailing systems are used both for ordinary mailing and for the electronic bulletin EXTEMPLO, which is at the moment offered both through a mail system in Gothenburg and as a IR-file in Stockholm.

4 CC EXPERIMENTS AT THE TECHNICAL RESEARCH CENTRE OF FINLAND

The Technical Information Service at the Technical Research Centre of Finland has followed the progress of new information technology in the field of information services quite actively. Our Information Service has had a significant role in introducing international online databanks in Finland from the early 1970s. Recently we performed a study to sum up the possibilities of new information technology in information seeking for Finnish users and this strengthened the special interest concerning computer conferencing as well as the use of micro-computers.

4.1 Background of the experiments

In the beginning of 1982 the Helsinki University of Technology started to offer CC software COM for general use in Finland. The Finnish Training Centre of the Engineering Organizations and the Finnish Academy of Technical Sciences sponsored the use by translating user manuals and organizing face-to-face meetings dealing with COM and its possibilities. Also some financing was directed for administering functions in COM use.

In order to promote the use a Teleforum Club was established. The idea of the club was to create computer conferences for discussions about the progress of technology in Finland. By this new media it was, at least in principle, easy to bring together both senior and junior engineers and the others for presenting opinions about e.g. 'creative problem solving' and 'capitalism and the role of the state'. The teleforum was open to all and everybody could open his own conferences in it. In the same system it was also possible to have protected

conferences for group work. Additionally from the beginning there were of course conferences for presenting new ideas about the use of the system; 'how to use COM software', 'problems in using COM', 'errors in COM', etc.

Our Information Service decided to join the club in order to gain experience of CC and examine its contributions to the use of conventional information services. A project was initiated, it being partly financed by the Nordic Council for Scientific Information and Research Libraries (NORDINFO).

The basic purpose of the project was to test some of the formerly mentioned ideas:

- information specialists transmit information (e.g. references from an international database) to support professional discussions about particular subjects
- a professional conference is opened by an online literature search being completed by discussions

So we studied the CC concept and systems, arranged connections and other technical and administrative matters with the Teleforum Club, asked permission for a group of online information providers whose references or data we were supposed to need, and everything began to be ready for the great success.

The administrative staff of the Teleforum Club was very much interested in our project, and it was easy to arrange all the matters needed. We sent a letter to about 20 database producers (general and technical information providers) to ask if they had something against our using their references in our experiment. Only one definitely refused, but understandably quite many asked for a guarantee that we would not use the references for commercial purposes, our experiment would not decrease the use of their services, because they were thinking we could establish a new machine-readable database, etc. Of course we were not doing anything like that, but we learned that copyright would cause problems if we wanted to make our trial permanent. Anyway, we were happily surprised at the interest many database producers showed in our efforts.

In order to make our policy clear we made the following announcement about distributing and delivering online records:

- the records may be distributed electronically to a particular computer conference by using the micro-computer in searching, editing the results and intermediating; references can be read by all the participants of that particular conference among other messages of that conference and they can be reviewed and examined in the same way as other messages - the possibilities depend on the computer conference software
- the use of records depends on the demand for online searches we offer to the participants of a Finnish conference and for a while in one of the Swedish teleconferences, too; the use will certainly be much less than one hundred records
- our purpose is not to test how to create new data bases from several old ones; our aim is to test some possibilities to serve the end users better as an intermediary
- for this trial we have in the project-budget money for 25 comprehensive online searches (dealing with several databases); in the future we shall offer references electronically via computer conference software, though this will take place on a one-to-one basis

Besides ordinary terminals, we used a portable terminal with bubble memory, where we can store electronically the results of searches, edit them locally and send them to the CC system - in the summer 1982 we started using micro-computers, which makes electronic processing and transmitting of information much easier. We have also a text processing facility for composing, editing and transmitting longer messages and good quality printing on paper.

As mentioned earlier, in our trial COM software was used. Besides the Teleforum Club in Finland, we have used both the international and the Swedish COM in Stockholm. To gain broader experience we used also the EIES in New Jersey.

Summary of COM commands (version 6):

Getting help

Other
List commands
Help <command>
<Command> ?

Reading messages

(Read) next letter
(Read) next notice
(Read) all news
(Join) next conference
Review (entries)
Only (read last)

Leaving COM

Quit

Show tables

Status (of)
Who (are present)
List conferences
List (all) users

Change membership

(Become) member (of)
Withdraw (permanently from)

Change parameters

Change address
Change telephone number
Write presentation
Set terminal (type)
Change name (of)
Change (own) password

Starting to write

Join (conference)
(Write new) notice
(Send a) letter (to)
Comment (on entry)
Personal (answer)

Typos on current line

<RUB OUT>/<DELETE>
<BACKSPACE>
<CONTROL-U>
<CONTROL-R>

Typos on finished lines

!Erase (line above) !7
(Remove last) !word !7
!Replace
!type (the text)
(Use) !editor VIDED
(Use) !editor SOS

Adding receivers

!Receiver:
!For information:
!Single copy:
!Subtract

4.2 Description of the experiments

After training for a while to use COM, we started our experiment by opening a conference 'Tietopalvelua COMissa', which in the first place was meant to be an open arena for discussions about our ideas to offer online data via COM. Besides the presentation of our project, information services were introduced on the general level and some examples of literature references were shown.

The discussion about our ideas was rather weak though quite a few showed interest in some kind of information helping desk and we think the use was low, as the users of COM were nearly 100 % adp experts and they were not so much familiar with information services and on the other hand they do not seem to need so much online data from international databases in their work. And at the time, May 1982, there were only some 40 COM users; see Figure 4 below.

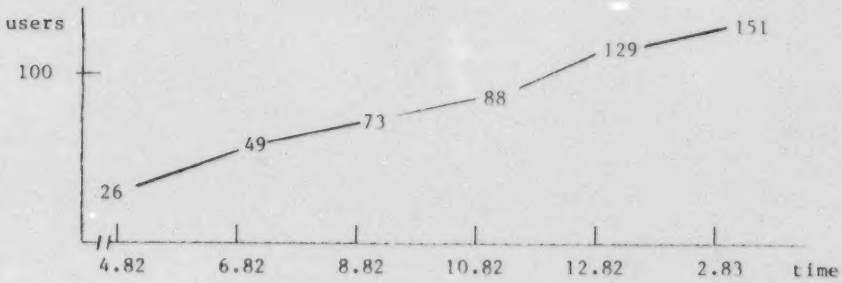

Figure 4. The development of the use of COM in Finland.

In August 1982 we made an announcement about free online information to the users of COM. The announcement was aimed at restricted groups especially in order to gain experience how our ideas would work in practice. Only a few requests were presented, this obviously being due to by the fact that there were not so many working groups using COM and this new opportunity was not sufficient to build up such groups.

At the same time, in August, we opened a conference for offering online searches for individuals also. At first we announced that there would be a charge for this service, though in practice this service was also free. In the figure 5 you can see parts of a search request and the answer.

```
What do you want to do? (Join) next meeting, Quit, (Type new)
entry, Comment (on entry), Answer (privately), Other.
- je tie vtt
 Join (meeting) (Yksilöllistä) TIETOPALVELUA (a la) VTT/INF

The title of the activity is: (Yksilöllistä) TIETOPALVELUA (a la) VTT/INF

(1983) 82-09-08 22:55 Sakari Mattila
Subject: Puheentunnistus

Minua kiinnostaa (henkilökohtaisesti) yksi automaattisen
puheentunnistuksen alasuunta "format frequency extraction"
eli "format trajectory estimation"

                    :
                    :
(2177) 82-09-29 15:22 Ari Koivisto
Comment to :1983: by Sakari Mattila
Subject: Puheentunnistus
Tassa yksi viite puheentunnistustiedonhakuun:

 THE APPLICATION OF A MICROCOMPUTER FOR FEATURE EXTRACTION FROM CONTINUOUS
SPEECH INFORMATION
 HUSBANDS, C.R.
 MITRE CORP., BEDFORD, MA, USA
 SPONSOR: IEEE; ACM; UNIV. OKLAHOMA
 MICROCOMPUTER '77 CNFERENCE RECORD  256-9  1977
 6-8 APRIL 1977  OKLAHOMA CITY, USA
 Publ: IEEE,  NEW YORK, USA
 IX+273 pp.
 Treatment: APPLIC
 Document Type: CONFERENCE PAPER
 Languages: ENGLISH
 (12 Refs)
 DISCUSSES THE SELECTION AND EXTRACTION OF SGNIFICANT FEATURES FROM AN
ACOUSTIC SPEECH WAVEFORM FOR MECHANICAL RECOGNITION OF SPEECH. IN THISP
APER A TECHNIQUE IS DESCRIBED WHICH MAKES USE OF A LOW COST MICROCOMPUTER
                    :
                    :
  Descriptors: SPEECH RECOGNITION; SPEECH ANALYSIS; COMPUTERISED PATTERN
RECOGNITION
  Identifiers: FEATURE EXTRACTION; CONTINUOUS SPEECH INFORMATION; ACOUSTIC
SPEECH WAVEFORM; SPEECH ANALYSIS; SPEEH RECOGNITION; FEATURE EXTRACTION
Voidaanko tiedonhaustasi myos laskuttaa?
Talloin asiaa voitaisiin tutkia vielä lisää.

Terveisin Ari Koivisto
PS.
Tassa kaytettiin Applea tiedonsiirtoon, tietopankki-Applen levy-
Applen tekstinkasittely-KOM
(2177) (comment in 2185)
```

Figure 5. Information service via COM (the subject is speech recognition).

Because of the quite low amount of COM use in Finland we decided to present our services in the Swedish version of COM at QZ in Stockholm

where there were hundreds of active users. So we created similar conferences and emphasized that the free service was for research -or other working groups. And we announced the opportunity widely in several conferences; see Figure 6.

```
(Text 16444) 82-09-15  11.52  Aatto Repo
Ärende:  Gratis information
-------------------------------------------------------------
§§§
```

Table 6. Conferences for information service in COM (the majority of search inquiries and asnwers were transmitted by a 'letter').

Name of the conference	Creation date	Number of members	Number of entries
Tietopalvelu COMissa (Finland) (Information service in COM)	21.4.-82	41	28
(Yksilöllistä) tietopalvelua (ä la) VTT/INF (Finland; Individual service)	5.8.-82	19	7
Informationssökning via KOM (Sweden; Information service in COM)	30.8.-82	61	23

These experiments in Sweden and in Finland indicated clearly the difficulty of combining the two different worlds of adp people and information specialists. Because of information overload and other such things among adp people the direct contacts of specialists have much more importance than classical information services. So in CC system information it is first asked of people and afterwards if you do not get an answer you may consider using information service. Anyway it became clear that if the users of CC systems need an information specialist, this person must be specialist in the same field as that person who asks for information.

On the other hand the CC system gives information service a good chance to present services and get feedback. This would probably work much better within one organization. As a complementary tool, computer conference helps information service to fulfill its clients' needs, but this requires also a new kind of attitude in information service. Information specialists have acted actively and quickly in response to the enquiries even though it would take some time to give the final result to the question asked.

In order to get everything going without delay the technical facilities must be in order. In our experiment we have occasionally had serious problems with technology. In Finland the biggest problem

in Autumn 1982 was the difficulty in getting in connection with the computer because of the lack of connection lines and this frequenkly ruined our efforts to provide quick service. In the Swedish COM the main difficulty was with telecommunication. And to make this kind of service continue you have to pay particular attention to the training of information specialists for this new way of doing their jobs.

In Table 7 we have collected those searches done during the experiment. We performed twelve broad literature searches of which eight were asked for. Most of the searches dealt with adp. One may notice that in several cases there has been feed-back from searches, and that it is not reasonable to send big amounts of references this way.

Table 7. The searches done by information specialists during our experiment; general advising and small searches excluded.

subject	client (C) on own initiative (O)	Number of contacts during the search	Amount of references transmitted
Three dimensional graphical programs (12.8.-82)	C	6	20
EMCS -editing software (14.9.-82, Sweden)	C	5	1
Micros and CC systems	O	2	4
Speech recognition (29.9.-82)	C	5	20 + 100 by post
District heating software (5.11.-82, Sweden)	C	4	20 by post
Microcomputer-based mail or conference systems (21.12-82, Sweden)	O	2	10
Man-computer interface (29.12.-82, Sweden)	C	2	15
Micro files in Lockheed (3.1.-82, done again 24.2.-83, because system destroyed the message)	O	2	presentation of files + 5
Pride avoiding learning (13.2.-83)	C	2	10
CC and developing countries (15.2.-83)	C	3	7
Air ships (22.2.-83)	C	3	10
New references of science fiction (24.2.-83)	O	2	10

Within our project we have also tried to promote the use of CC systems among information specialists. We have had several occasions where we have introduced our ideas (the broadest arena was the 6th International Online Meeting in London, December 1982 /24/). We are also suggesting that NORDINFO would support a trial where Scandinavian information specialists could use COM at QZ in Stockholm for building up online user groups dealing with e.g. Nordic databases in SCANNET; see Appendix 2.

In Finland we have announced COM for information specialists especially within the Finnish Society for Information Services. These last-mentioned efforts failed in practice badly because of problems of the computer resources, but now when the situation has changed the efforts may be continued.

As a conclusion of these efforts at the moment we feel that information specialists were not yet ready for this kind of working together. One reason for this seems to be the lack of personal work stations which would make CC much more convenient. Another reason is that it may be hard for information specialists to be forerunners in a field where informal information transfer is dominating while they are used to formal information - information as a product to put in a nice package. Probably the most effective impulses could come from the organization the information specialists are working in.

Our information service has used COM in communication within our own unit and with some specialists working in the other units of VTT. We have gained the most promising results from relatively free discussions in closed COM meetings with a couple of other people (in these cases adp experts) from VTT; for example these discussions have dealt with our micro-computer acquisition plans.

We opened also closed conferences 'What is happening at the Technical Information Service of VTT' (see Figure 7), 'General discussion arena for information specialists of VTT', but it proved to be too heavy a system as all but one of our information specialists are located in the same geographical place. Still most of our information specialists

considered the CC system would be a good facility when we all have our own personal work stations in the future.

```
The title of the activity is:  INFin tapahtumakalenteri

You have seen all 12 entries.

What do you want to do?  (Join) next meeting, Quit, (Type new)
entry, (Send a) letter (to), Other.
- rev 3241
 Review (entry) 3241

(3241)  82-11-09  12:17  Sauli Laitinen
Comment to :3233: by Aatto Repo
Subject:  Pesäpuuna
EDELLINEN MODIFIOITUNA:
AIKA JA PAIKKA    AIHE
1982-11-09        VIDEOESITYS LIBRARY
INF LEHTIAULA     OF CONGRESS'IN TOIMIN-
                  NASTA
1982-11-29        SISÄINEN SEMINAARI:
INF SEMINAARI-    RAKENNUSALAN INFORMAA-
HUONE             TIOPALVELU
```

Figure 7. An example of messages in a protected conference of 'What is happening at the Technical Information Service of VTT'.

4.3 The opinions of the users and future prospects

As already mentioned, we carried out an inquiry to get opinions about the usefulness of information service in COM. We aimed our questions at the thirty most active Finnish COM users excluding the COM administrator and the information specialists at VTT five in all; almost all these people were adp experts. Fourteen of these twenty-five answered, so the response rate was 56 %.

In order to get some background we first asked about the main reasons for using COM. Seven out of fourteen used COM partly in their work, seven for getting acquainted with this new facility, while nine mentioned that they use COM also for fun.

Twelve out of fourteen had used classical library services, but only five had used online literature searches. Three out of these five also used our experiment for gaining free information through COM and one new online data user was found. These four searches dealt with litera-

ture references and all were satisfied with the results they got. The 'natural' occasion for asynchronous discussions about search results with the information specialist was mentioned as especially useful.

The majority of those who answered were in principle willing to use electronic information service through COM; only one claimed not to need this kind of service. Nine out of fourteen were interested in the help desk of information channels in general; eleven liked to use online literature references; seven wanted factual or textual data; and international information (8/14) was needed much more than national (2/14).

The last question dealt with the need for electronic information service now and in the future. The majority considered information service in the CC system as complementary to other services. In the future when CC systems will obviously be in general use, it will be important that also information service is available in the same system as other methods in access to information. Still several users felt that systems like COM mainly support contacts directly among professionals and this 'official' information the information services transmit is secondary - though one can say to this that in many cases a specialist refers to articles or monographs, and information services are often good places for acquiring such pieces of information. Anyway CC systems simulate new demands for information services in flexibility. When systems like COM become more common, people with their personal work stations (micro-computers) will surely be willing to make their own searches. This surely increases the need for instruction and CC gives a good tool for it.

As in many cases dealing with technology, here too 'the readiness factors' /25/, like socio-economical trends and technological developments, are just not enough for the break-through of new equipment or a system. This was true in our experiment, too. The Teleforum Club did not immediately become a broad discussion arena, as was supposed, and the participants of the club were and still are chiefly adp experts speaking mostly about CC as a system and its possibilities and adp subjects like programming and micros - so far not much discussion about matters for which one might need information services. To

promote the use of CC in connection with information service in the future, several readiness factors must still be fulfilled.

* TECHNICAL EQUIPMENT AVAILABLE
* READINESS TO LEARN TO USE A CC SYSTEM
* NEED TO USE
* JOINT GOAL IN A PARTICULAR CONFERENCE
* GEOGRAPHICAL ISOLATION
* BUSY PEOPLE
* NEED FOR LITERAL COMMUNICATION
* ENOUGH USERS IN THE SYSTEM
* HUMAN LEADER FOR THE GOAL-AIMING CONFERENCE

Technological equipment and tentative ability to learn a CC system are basic conditions for its use. In our project we had quite a lot of difficulties with technology. Learning to use the system was no problem at all for information specialists, who are familiar with online database systems. It seems that real utility of this kind of electronic information service will not gained widely before common use of personal work stations (personal terminals or personal computers) and flexible programs in them for down-loading, editing and transmitting information.

'Need to use' factor refers to individual users and 'joint goal' to organizations, project groups or ad hoc groups. The Teleforum Club is a free discussion arena for individuals, though some organizations and project groups have started to use the same systems in 'real work'. This kind of approach seems to be quite good in introducing new facilities, but to make the use grow and to get more utility out of it, 'real jobs' must be done by the CC system quite quickly after the introduction period otherwise many users may 'quit forever'. For information specialists this means that when their clients use CC they have to use it, too - in the meantime the use is depending on such

factors as whether a CC system is in the same computer as those databases they mainly use or whether it is not, etc.

Geographical isolation and busy users are surely important conditions. It must be remembered that one hundred meters is often a great barrier to communication and for busy people CC gives an ideal tool to communicate when they have time for it, thanks to asynchronousity. We found during our experiment the use of COM to be quite convenient in over-coming geographical distances: it was as easy to use an information specialist sitting ten meters away from you as one five hundred kilometres away. In literature searches a couple of days' delay is not remarkable, but CC gives an information specialist a comfortable tool to give preliminary information about when and how she/he is going to do the search. When CC becomes more used, it will be necessary to consider special strategy for information service in it.

Literal communication surely clarifies inquiries for information service, but here too CC is more a complement to than substitute for the telephone, for example. Additionally an asynchronous literal help desk would be more convenient for information service than telephone calls.

Extensive use of one CC system makes it easier to communicate: when many people you need to communicate with are in the same system, you avoid several cumbersome log in etc. For example, there are plans that in the near future Finnish online users would join a CC system for building up a user group for online systems - and some of the most active people would join Scandinavian groups etc. The coming standards for sending messages between different systems will surely make it easier to use several systems. National systems make practising more convenient and cheaper, too. A human leader for a CC is needed when there are, for example, decisions to be made. When having some service in a CC system, every now and then cleaning up the conferences is desirable.

These readiness conditions are not always all needed at the same time, but to get real benefit out of the system they all are more or less necessary. Besides these conditions, there is a need for 'enabling

forces' /25/ like improving user-orientation, advocating and supporting service to make CC services more used. And here information specialists as a group of knowledge workers have a challenge in broadening the effective use of the right information in the right amount in the right time and in the right place - even asynchronousity has its bounderies.

5 CONCLUDING REMARKS

As a technological facility, most CC systems are at least satisfactory and when potential users get their personal workshops everything is ready for a great success. Expertise grows in those systems by people and information (for example by the help of information services). But this is not enough;

> "to understand information systems properly one must look not just at the items of information involved, but one needs to look deeper into the 'information sphere' - at the attitudes, personality and motivation structures of people involved. The people involved do not act simply as passive receivers of information, 'sinks' which passively absorb information presented. Neither do they act simply as unintelligent 'switches' in a system, routing items of information from one mode in a network to another in an unthinking way. They do not inevitably forward items of information received, and to this extent they can be regarded as 'sinks', but they are 'active sinks'." /5, p. 148/.

The above situation stresses the point that communications through CC are still human communications and so both in introducing and using CC systems the users' attitudes and motivations are what really matters. The personal beliefs in the benefits of a CC system and beliefs about what other significant people expect are even more important than excellent technology. About technology one could say: it is not important when it works! Empirical sociological studies have already started to be performed combined with the EIES /7/, /26/, but an action research approach would also be interesting here /8/.

In introducing a CC system there have been and still are both technical and human problems /14/, /19/. Technical problems include the lack of standards in CC commands and there are problems in transferring messages between several CC systems in spite of efforts made within the GILT and MAILNET projects. Especially Eastern Europe and developing countries suffer from insufficient geographical coverage of telecommunication networks and there is room for much improvement in reliability and interconnections of those networks which already exist. There is already quite a lot of CC software, but user friendliness of many systems could be better, though COM and PORTACOM systems are rather satisfactory.

On the legal and political level, there are many problems to be solved when CC use broadens, particularly in international communications. The role of national PTT's in differing attitudes towards CC is interesting: some PTT's have no objections to private CC systems, but others like the British Post Office are more strict regarding it. There are several predictions concerning what will happen. One /19/ is that the different PTT's will themselves offer high-quality computer conferencing facilities on a large scale over their public networks and this might replace the role of the present 'private systems'. On the other hand it is probable that private networks like Telenet and Tymnet and governemental university networks will have their role, too. Besides, behind all this there are unsolved questions of international data flows concerned with interdependency, privacy, etc. One can only hope these negotiations progress so that they do not hinder the promising growth of international communications.

Additionally there are unsolved problems regarding e.g. organizing and evaluating information, citation and attribution, archiving, information overload and copyright. However, one could say these are mainly problems of past and present and apply to the old system of information transfer, which of course must be considered. But CC as a new way of communicating will surely overcome these and other problems arising, if and when the users notice the efficiency of this (mainly) new communication. Among the optimists for CC there was also the workshop Computer-Based Conferencing for Developing Nations /27/. The major conclusion of the participants was that Computer Based

Conferencing Systems (CBCS) will become a major domestic and international scientific and technical information exchange vehicle.

Computer conference will be not the only, but an important means of communicating in the future. As a conclusion of what this may mean for the information service community one could rise up the following scenarious of the computer conference:

* INFORMATION SPECIALISTS TAKE PART IN THEIR CLIENTS' CC SYSTEMS
* THE EMERCENCE OF "GREY INFORMATION"
* A TOOL FOR INVISIBLE COLLEGES
* THE IMPORTANCE OF "OFFICIAL" INFORMATION RETRIEVAL MAY DECREASE
* KNOWLEDGE WORKERS COMMUNICATE MORE DIRECTLY WITH EACH OTHER
* COMMUNICATION NETWORKS INCLUDE CC SERVICE
* PUBLISHERS CREATE ELECTRONIC VERSIONS FOR PERIODICALS
* INFORMATION SPECIALISTS TURN TO RETRIEVAL PEOPLE INSTEAD OF DOCUMENTS.

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The COM and PORTACOM computer mail and conference systems - summary of facilities

Function	Implementation
User interface	Individually composed menus but in reality command driven, since any command can be given to any menu.
Help facility	"Help <command>" describes that command.
Text data base	The text data base consists of a text directory and a number of text items.
Links between texts	"Comment" links can be established between text items. Several comment links can refer to the same item creating recursive tree structures.
Conference data base	A conference consists of a list of members and a list of links to text items. The same text item can be referred to from several conferences. Links from a conference to a text item can be of type "Receiver" and "For information".
Conference types	Conferences can be of several types, the most important being: OPEN, where any user can join the conference, CLOSED where the organizer decides who can participate, WRITE-PROTECTED to which only the organizer can establish links from text items, PROTECTED where all information about the conference is hidden from non-members.
User data base	A user has a list of conferences, in which that user is a member. Every user has a "personal conference" storing letters to and from this user. One and the same text item can thus both be linked as a conference entry to one or more conferences and as a letter to one or more individual users.
Name data base	The name data base contains names of users and of conferences with links to the conference and user data bases.

News control	For every user who is a member of a conference, the system notes how far that user has read in the conference. This marker is updated whenever a new entry is read. A user can be automatically guided through all new letters and all new conference items, one conference at a time, but the user can choose a different path for scanning news and can modify the default path according to which conferences with news are presented. The same text item is not shown twice to a user, even if the user is a member of two conferences and the text item was sent to both conferences.
Text item retrieval	By conference, writer, receiver, item number, item range and (in PORTACOM) content. Comment chains can be traversed. Browse facility available. Items of interest can be marked by an individual who wants to see them again later.
Name data base retrieval	Names of users and conferences can be matched from abbreviated search words. In COM version 6, general text search is also available on the name data base.
File system interface	Text items can be saved on files, files can be submitted as entries or as command files.
Text editing	Simple text editor built into the system. COM version 6 also provides a facility for calling an arbitrary external text editor.
Terminal type modes	The system can be adjusted to different terminal types.
User modes	Some user interface facilities can be adjusted according to individual user preferences.
Tables and statistics	Commands to print out lists of users and conferences, lists of members of a conference and usage statistics.
Disk cleaning	Automatic facilities for removing old text items when space is needed for new text items. (In COM version 5: By running a disk cleaning program. In COM version 6: Also old conferences and users are automatically removed when space is needed for new users or conferences.)
Text interchange with other CBMS-es	GILT and ARPANET MAIL protocols under implementation. COM has a working protocol for interconnection of COM systems only.
Special program interface	A "special program interface" is available which allows computer programs to act as "users" in reference to the system.
Implementations	COM has been in production usage for several years at about 15 DECsystem-10 and DECsystem-20 installations. PORTACOM will be available for Norsk Data Nord-100, Burroughs B 7800, CDC Cyber/NOS, Digital Vax-11/VMS, IBM 370/VSI, Siemens 7.760/BS 2000 and Univac 1100 computers.

APPENDIX 2

COMPUTER-MEDIATED COMMUNICATION (CMC) FOR INFORMATION SPECIALISTS IN SCANDINAVIA

According to our experiments in the project of combining computer conference with information service, a computer-mediated communication system is an ideal tool for such a professional group as information specialists. So a computer conference system could give an attractive new possibility to promote joint work among information specialists in Scandinavia.

There have been discussions about the idea of offering an electronic forum for information specialists, for example within NORDFORSK and within NORDINFO, too. Within NORDINFO these discussions have been in connection with the projects and plans dealing with electronic publishing e.g. EXTEMPLO, which is an electronic news bulletin for information specialists originally supported by NORDINFO.

User groups have been established inside Scandinavian countries and at least in Finland there have been preliminary plans to use the computer conference system to support this work. On the Scandinavian level the activities the computerized system could support could be

- help desk for the users of SCANNET DATABASES
- general news bulletin (like EXTEMPLO)
- communication facilities of joint projects
- a facility for routine meetings and preparation for face-to-face meetings within e.g. NORDINFO and TIDSKRIFT FÖR DOKUMENTATION
- messaging among the users of the system

In practice there are at least three different kinds of systems available for the Scandinavian user group:

1) Computer conference systems, like COM

2) Electronic mailing systems, like Informationvärldens system or Quick Mail in Mark III network

3) Electronic bulletin board systems based on a micro computer, like Apple Bulletin Board System (ABBS).

These kinds of new possibilities are hard to rate before people have actually used a system for a while. According to the studies these are mostly new - but effective - communications. Until now we have had to get along without them, but with the help of the CC system we can realize much needed communication among information specialists in the Scandinavian countries.

A computer conference system COM, which is especially a user friendly system, would support all the formerly mentioned ways of use. COM is mainly a tool for conferencing and so it is not specialized for information retrieval (which facilities e.g. the CC systems EIES and PORTACOM have) and electronic publishing facilities, though you may use it for these activities too. The costs of use depend on the type and the time of use. The use at QZ in Stockholm in Swedish working hours is 35 - 75 FIM/hour for universities, for other non-profit research 125 FIM/hour and for others 150 FIM/hour plus telecommunication costs for dialing to Stockholm.

Electronic mailing systems on the other hand are clumsy for conferencing, but e.g. Informationsvärldens system has some advances compared with COM: it is even more easy to use and it is free at the moment.

There are several electronic bulletin board systems for different micro-computers. The ability of systems to support conferencing and information retrieval is quite poor, and systems usually allow only one user at a time. Still they are cheap alternatives, if only some electronic help desks and publishing facilities are needed.

A proposal for NORDINFO:

1) NORDINFO should finance the establishment of a CMC system (only some checkings for the best possible system solutions) by 5,000 FIM.

2) Support for free trial period for users would need some 25,000 FIM (100 users x 20 hour x 125,-)

3) NORDINFO should hire a part-time administrator for the Scandinavian User Group (SUG) 40,000 FIM/year. The SUG-administrator should establish COM conferences e.g:
   - HELP DESK FOR SCANNET DATABASES (OPEN)
   - INFORMATION SPECIALISTS NEWSLETTER (WRITE PROTECTED); and this conference would need a news editors to whom Scandinavian information specialists could send news to be placed into the conference INFORMATION SPECIALISTS NEWSLETTER - there could even be an open news forum where everyone could put news.

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COMPUTER CONFERENCE IN INFORMATION SERVICE

Tiivistelmä — Referat — Abstract

The Technical Information Service of the Technical Research Centre of Finland has studied the role of computer conference (CC) within information service communities. The integration of adp-, storage and telecommunication technology by the help of CC systems is making it possible for the knowledge workers to do their jobs much more effectively. Computer Conference is an asyncronous meeting with typed messages and additionally the CC software usually supports text processing, collaborative electronic publishing, information retrieving and personal documentation, though there are signs that it will be more reasonable to use some of these facilities locally, when communicating micro computers come into wider use.

The connections of the CC systems to other telematic technology, CC systems configurations and several examples of their use in practice will be introduced. The CC software, COM and EIES are examined more closely. On the idea level it is possible (1) to use CC within the information service professionals and (2) to offer information services to the clients via CC software. These ideas are examined and the former studies are explained in the report.

The practical experiments for offering information services via the CC system were performed by COM software in Finland and Sweden. As CC communities mainly include adp experts, the use of online references was quite low. The break-through of the CC systems still waits for the spreading of personal work stations and after that rises the need for studying human communication via CC systems more thoroughly. For the information specialists this emergence of CC systems means e.g. the need to offer information services via CC systems, and to realize the increasing inportance of "grey information" and personal contacts in accessing information.

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